Assessing Wetland Bird Communities

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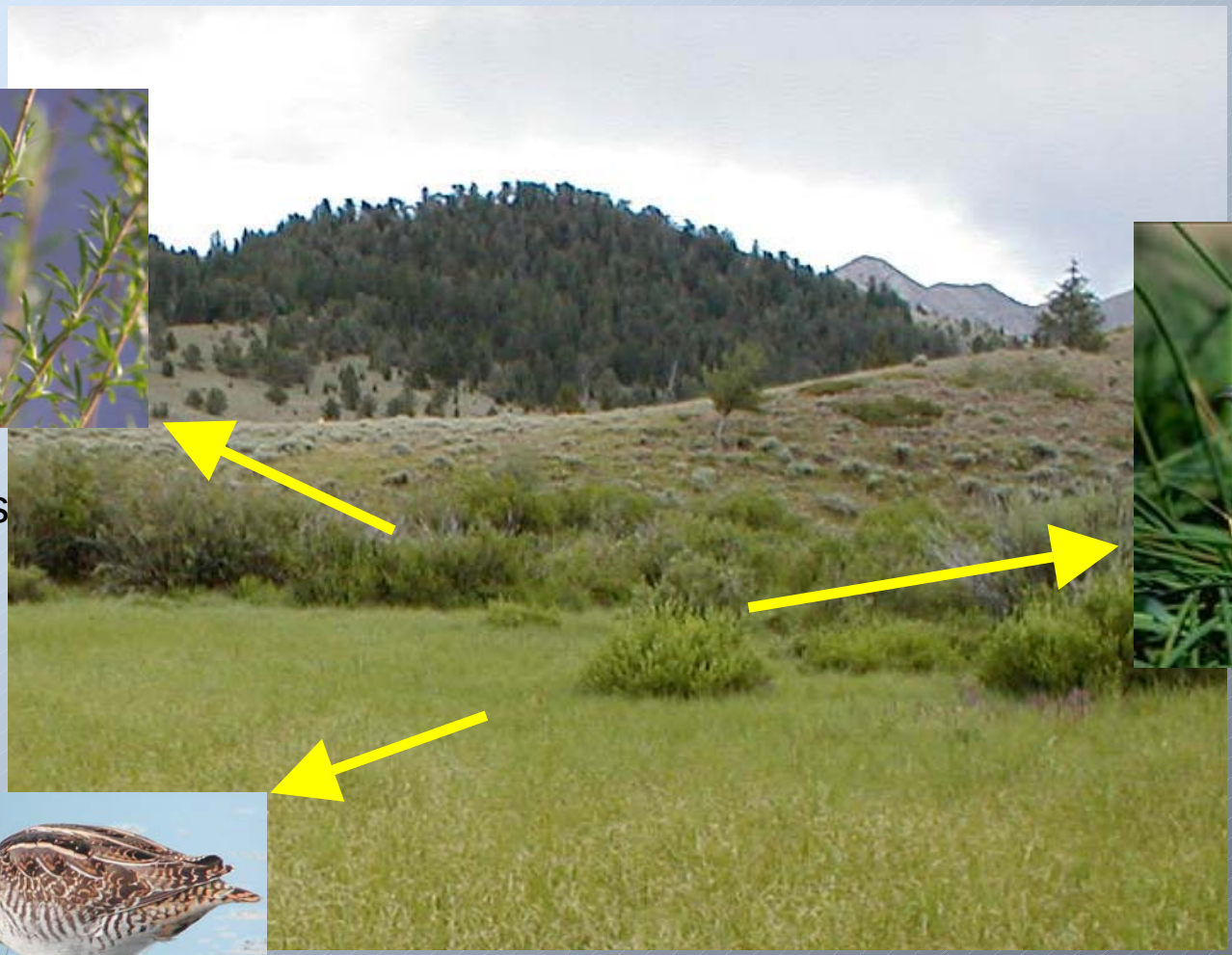
Why Use Birds?

1. *Sensitive to array of wetland conditions*
   - Reflect the cumulative impacts of multiple stressors
   - Multiple spatial scales

Wetland Vegetation

Riparian Hardwoods



Thick-stemmed Emergent Vegetation

Sedge Meadows

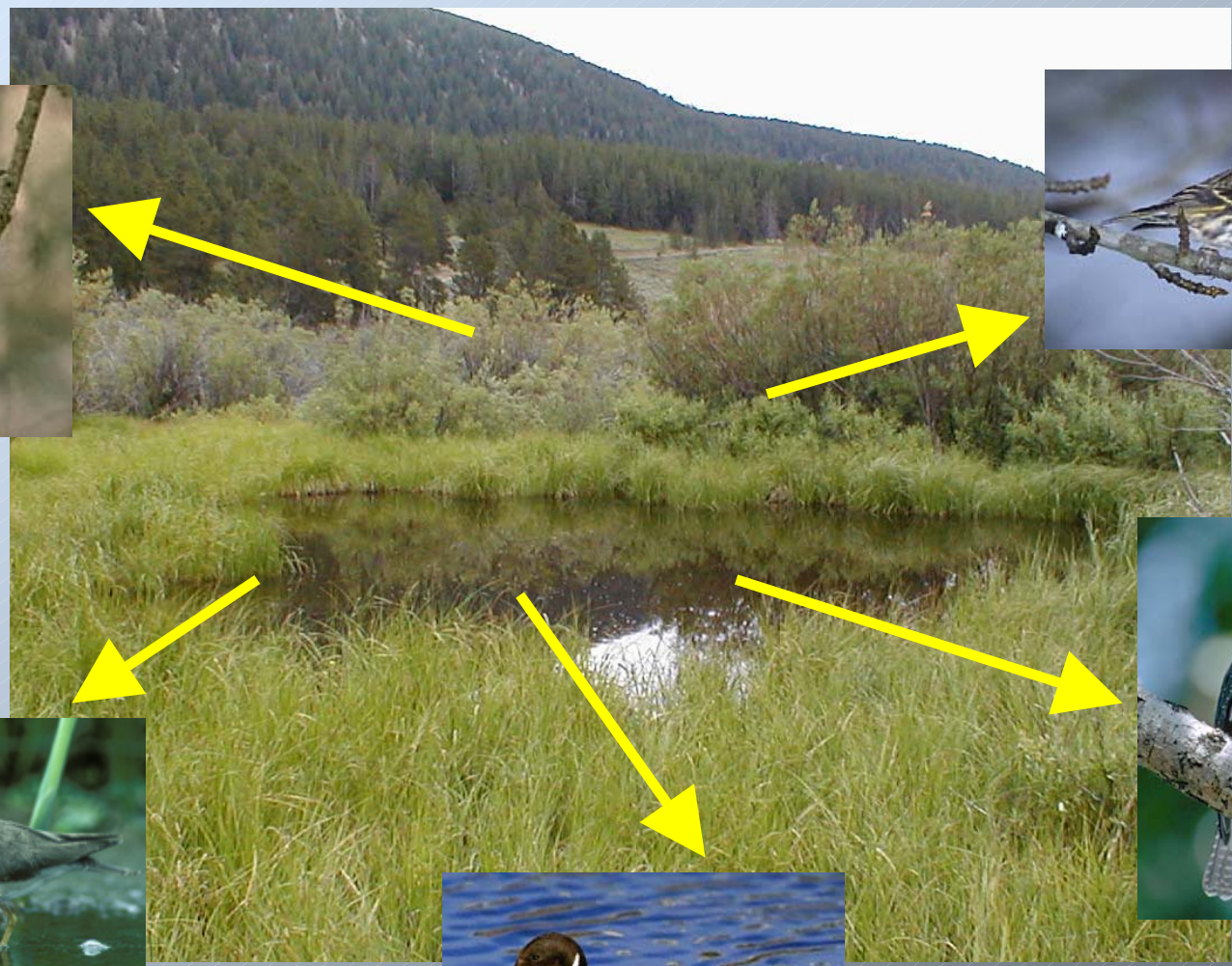
Water Quality

Nutrient & sediment loads

Water depth & duration

Contaminants

Productivity



Insects

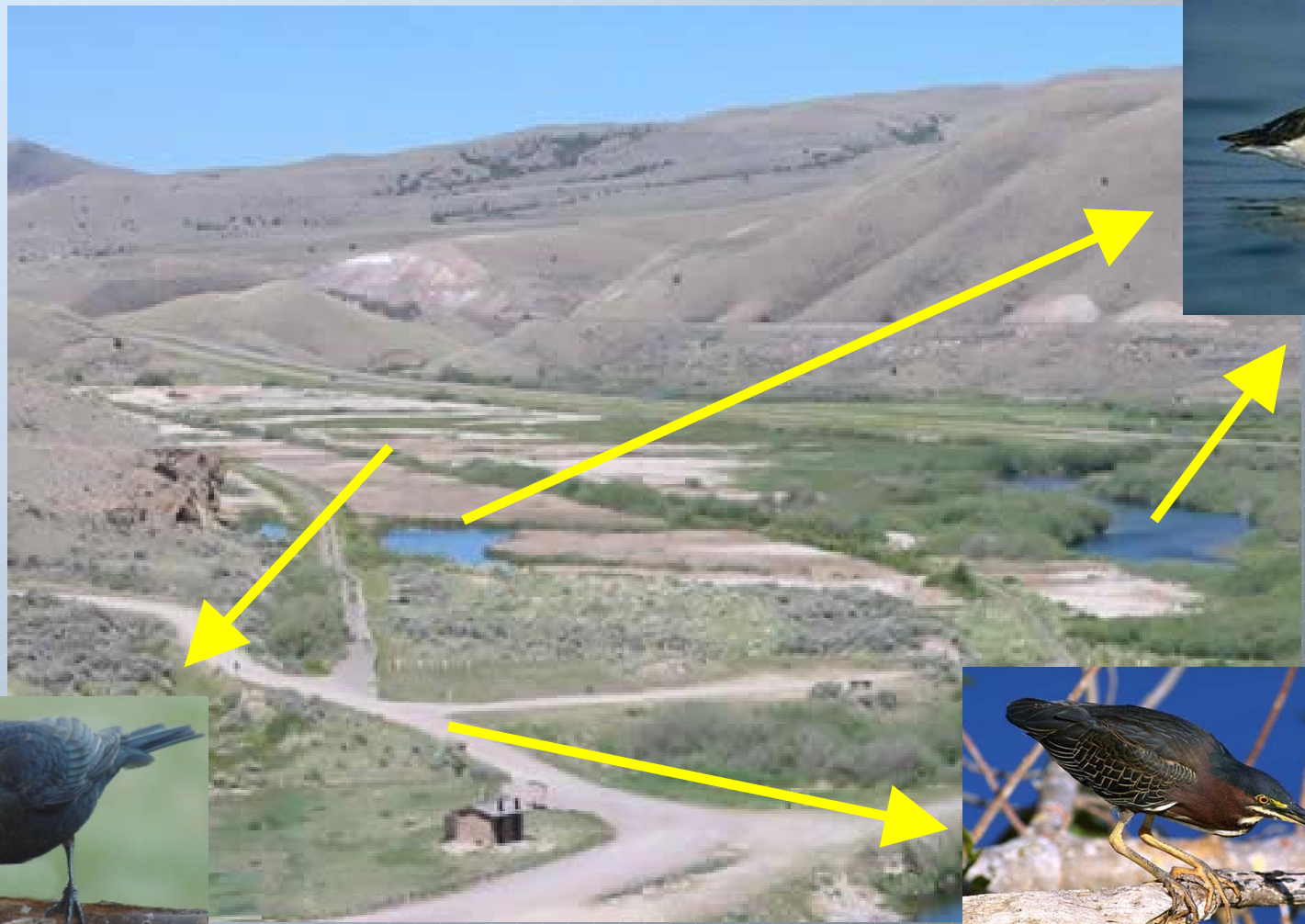
Seeds

Aquatic Invertebrates

Aquatic plants

Fish & Amphibians

Landscape Context



Wetland quantity & connectivity

Upland conversion & fragmentation

Road Density

Why Use Birds?

2. *Abundant and easily surveyed*

Why Use Birds?

3. *Public interest in monitoring bird populations*

What can a Bird IBI tell us?

1. Assessment
2. Protection priorities
3. Watershed planning
4. Bird monitoring

Developing a Bird IBI

1. *Select Sites*

- Ecological Region

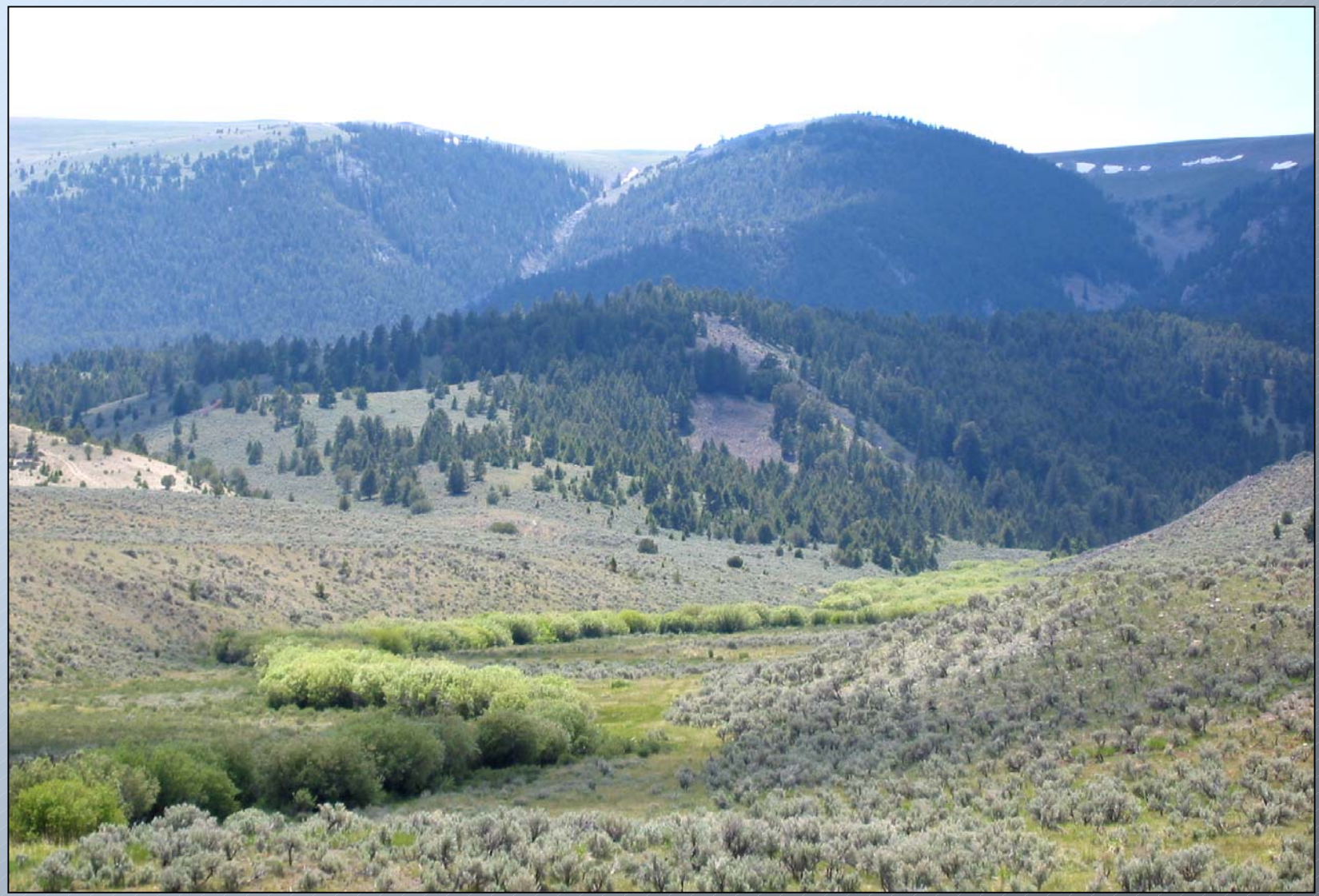
  Watersheds: Middle Milk
  Red Rocks

- Wetland Type

Selecting Wetlands for Bird Assessment

- Wetland types must have sufficient moisture to support wetland associated bird species
- Representation of a range in human disturbance across scales
- Wetlands must be of sufficient size (at least 1 ha)

Red Rocks: *Headwater Riverine*



Red Rocks: *Beaver-Influenced Wetlands*

Role of Beaver

- Create lentic habitat
- Increase riparian width
- Increase emergent vegetation
- Alter shrub & canopy layer

Beaver Site Selection

- Beaver-influenced wetlands along headwater streams
- Intact dams retaining water
- Altered hydrology beyond original stream bank-full width

Developing a Bird IBI

2. *Conduct Bird Surveys*

Point counts

- Counts of all species seen or heard
- Where visibility is limited by vegetation
- For surveys of songbirds

Area searches

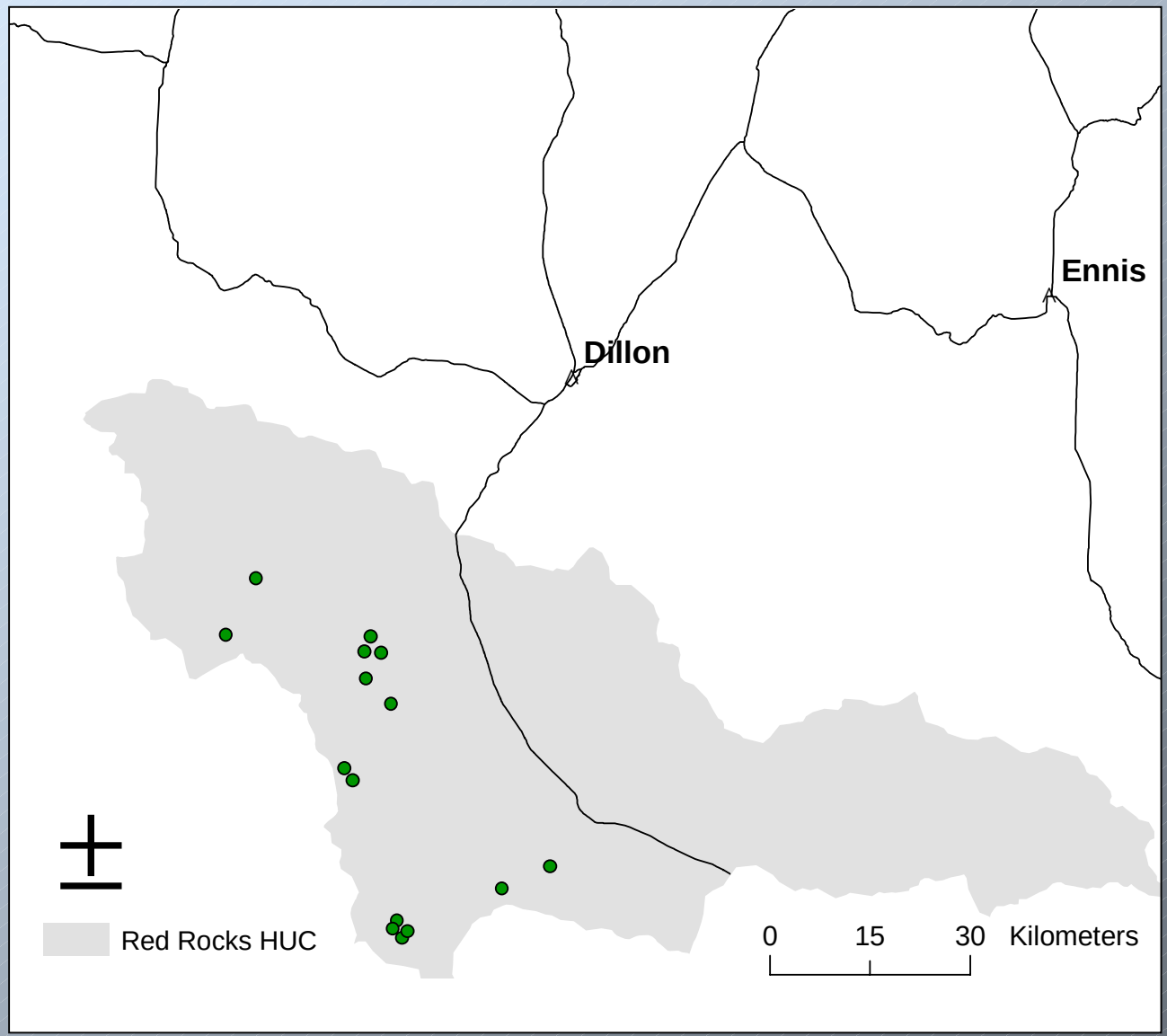
- Direct counts of all species seen
- Non-singing birds like waterfowl, shorebirds
- Where visibility is not limited or obstructed

Developing a Bird IBI

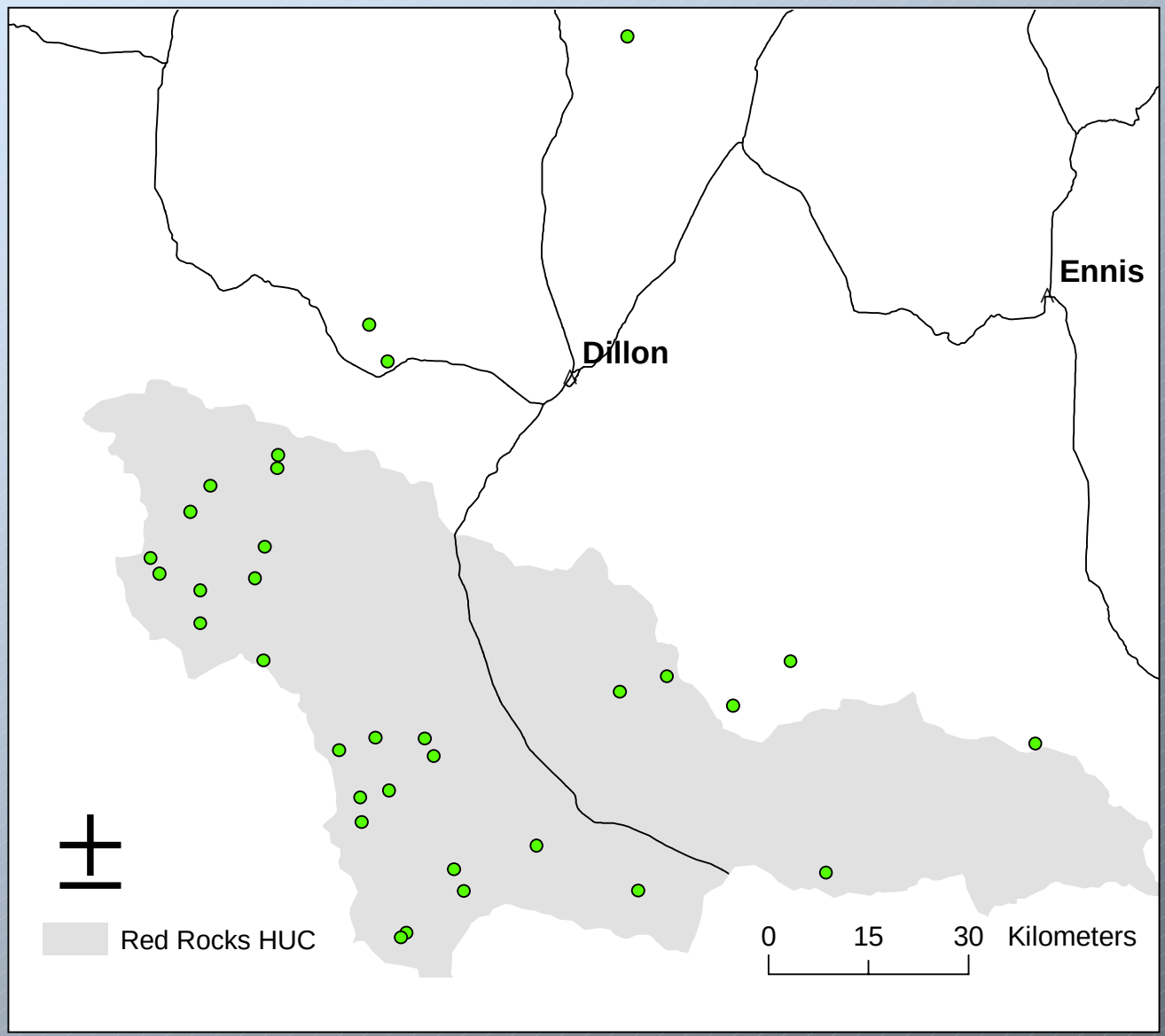
Survey Methods

- Within 4 hours after dawn
- All sites surveyed 2 times
- Along a 500-m transect
  - Beaver sites: transect of variable length
- 5-min point counts every 100 m
  - 50-m radius of point
- Area searches for waterbirds

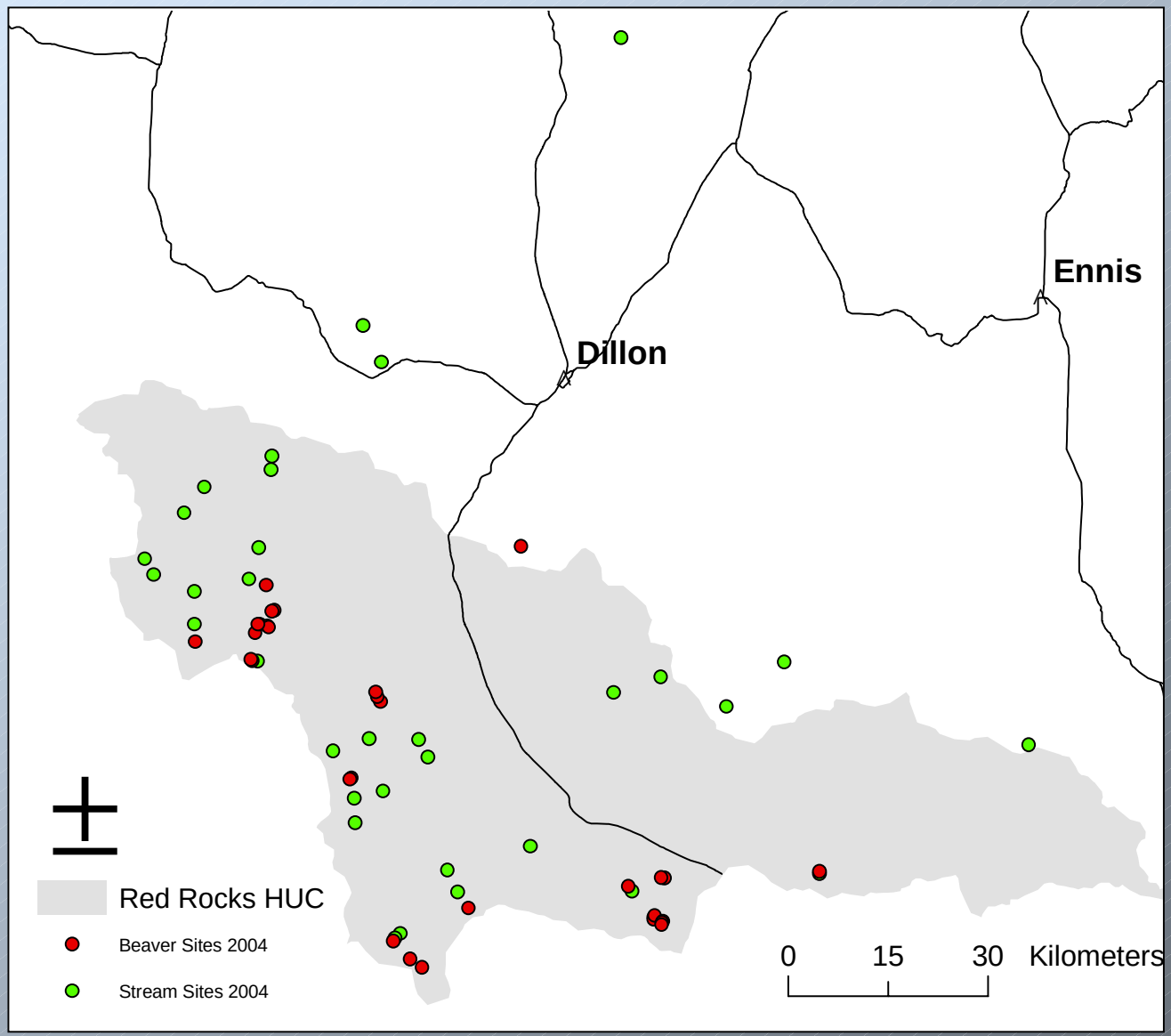
2003 Bird Survey Sites



2004 Bird Survey Sites



2004 Bird Survey Sites



Developing a Bird IBI

3. Rank site condition along gradient of human alteration

Developing a Bird IBI

4. Create Metrics

- A useful metric varies predictably along the gradient of human disturbance

- Find species and groups of species sensitive to impacts
  - Individual species presence/abundance
  - Presence/abundance of species within functional groups
    - Eg. Aerial insectivores, neo-tropical migrants, etc.
  - Proportional distribution (evenness) of species

Summary of 2004 Bird Surveys

	Species		Abundance	
	Mean ± SD	Total	Mean ± SD	Total
Riverine sites	11.5 ± 3.3	76	26.6 ± 9.7	1,956
Beaver sites	10.5 ± 2.9	71	14.06 ± 4.8	1,001

Summary of 2004 Bird Surveys

Riverine

Species	Total
Yellow Warbler	207
Warbling Vireo	171
Lincoln's Sparrow	57
Song Sparrow	48
MacGillivray's Warbler	44
House Wren	23
Black-capped Chickadee	19
Red-naped Sapsucker	18
Lazuli Bunting	16
Spotted Sandpiper	16
Wilson's Warbler	16
Grey Catbird	9

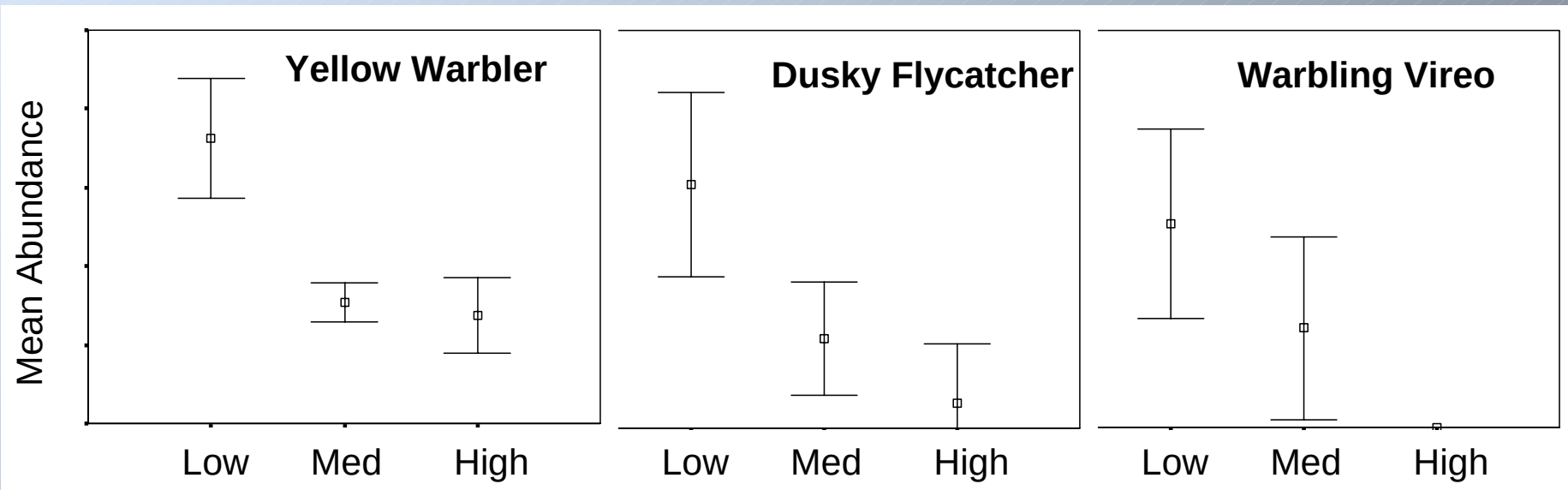
(Riparian/Wetland Obligate)

Beaver

Species	Total
Yellow Warbler	72
Song Sparrow	71
Warbling Vireo	59
Tree Swallow	59
Lincoln's Sparrow	44
Wilson's Snipe	27
Green-winged Teal	25
Spotted Sandpiper	16
Red-winged Blackbird	16
MacGillivray's Warbler	15
Mallard Duck	14
House Wren	9

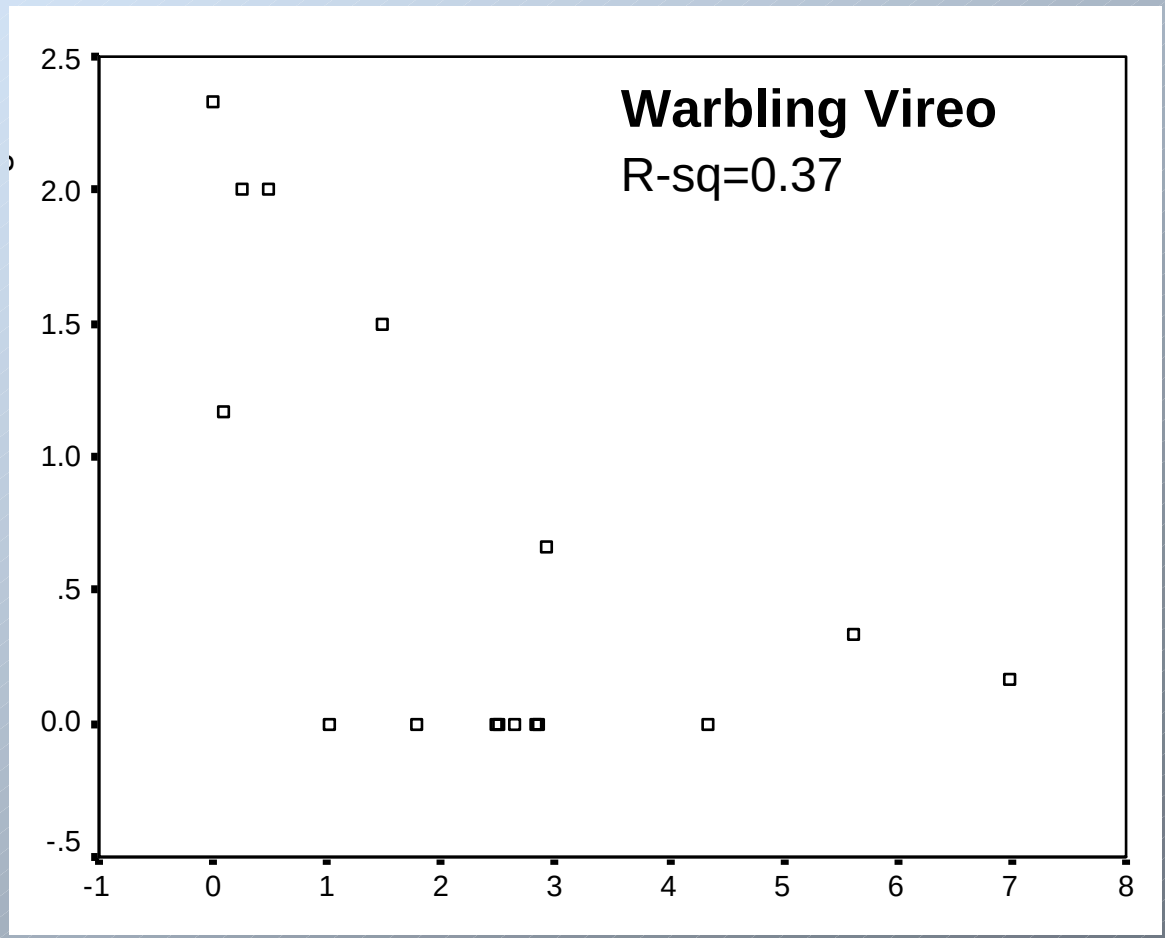
Riverine Wetlands: *Preliminary Analysis*

Grazing Intensity



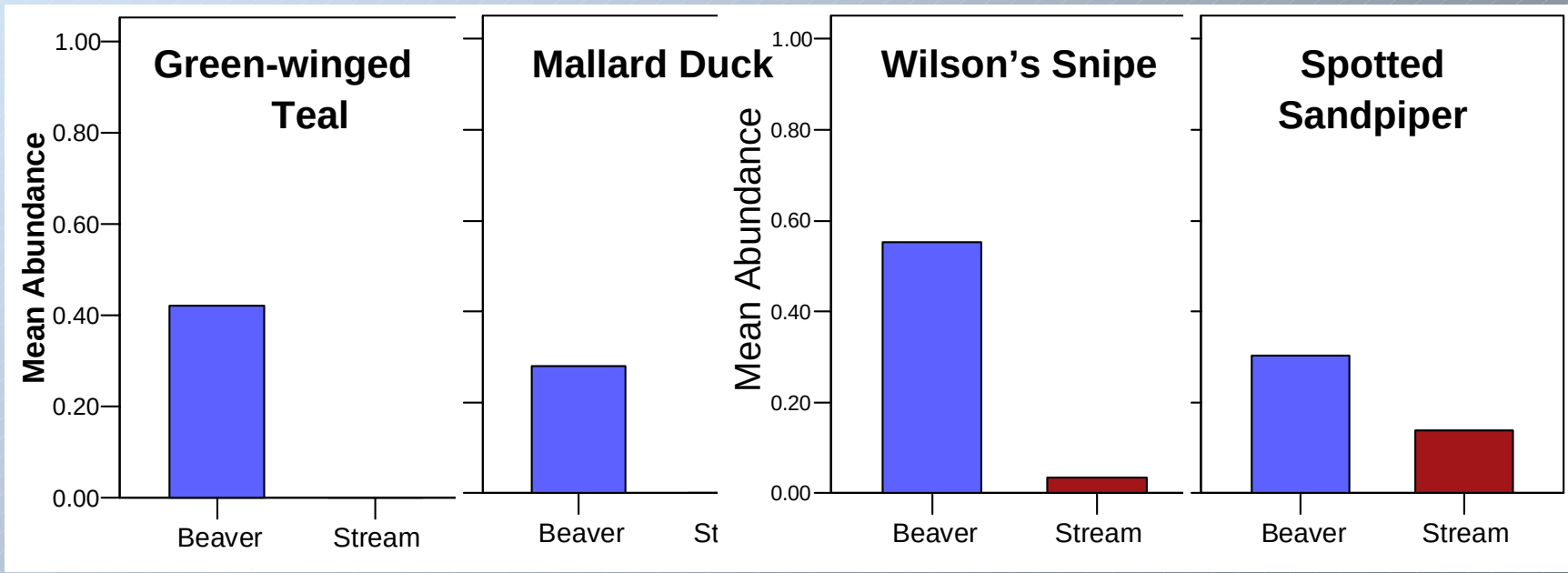
Riverine Wetlands: *Preliminary Analysis*

Watershed scale



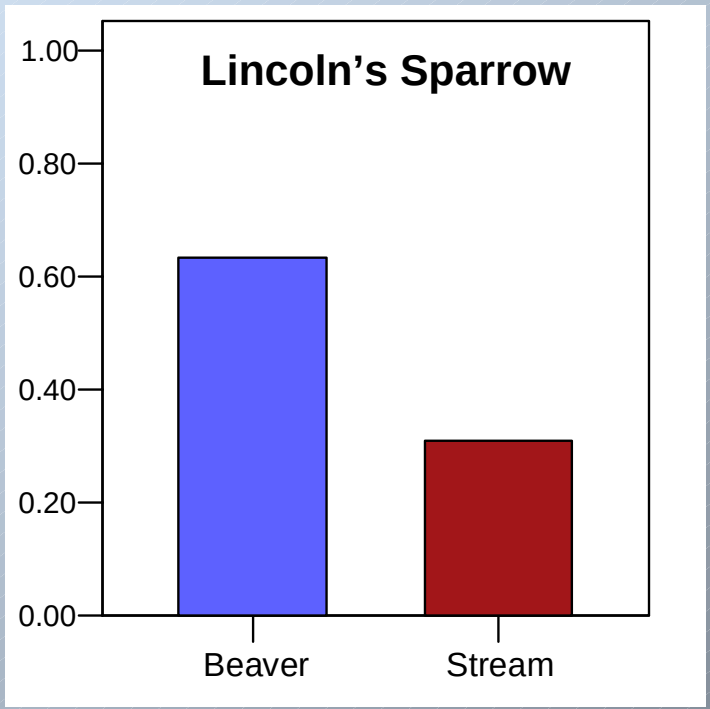
Influence of Beaver

Birds associated with lentic sites or emergent vegetation

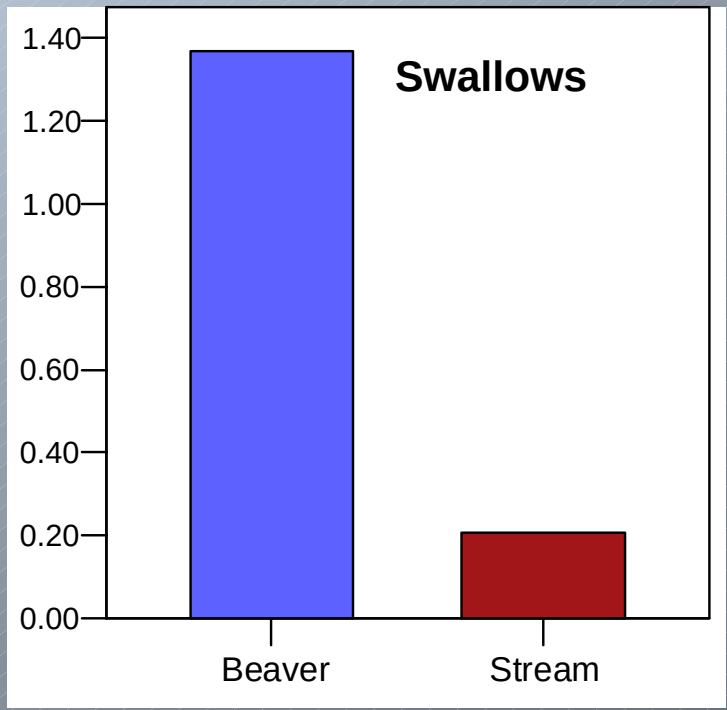


Influence of Beaver

Birds associated with low shrub cover



Aerial insectivores



Examples of Metrics

Candidate Metric	Relationship to Disturbance Gradient
Frequency of occurrence of insectivorous aerial foragers	decrease
Percent of species that are long-distance migrants	decrease
Proportional abundance (%) of blackbirds and starlings	increase
Number of species that typically feed on submerged aquatic vegetation	decrease
Cumulative frequency of occurrence of all regionally rare species	decrease
Frequency of occurrence of egg-predating or parasitizing species (e.g., corvids, cowbirds)	increase

(EPA 2002. Biological Assessment Methods for Birds, EPA-822-r-02-023)

Developing a Bird IBI

5. Derive index of biological integrity and use to assess wetland conditions

- Combine metrics into a single index of biological integrity
- Evaluate how well the Bird IBI reflects wetland condition
- Use bird IBI in combination with scores derived for other wetland metrics to assess the state of each wetland type for the region

Next Steps

1. Apply Bird IBI to same wetland types for other regions

2. Develop bird IBI for additional wetland types

3. Develop long-term plan for monitoring wetlands statewide

Implementing Bird Assessments

Statewide bird & wetland monitoring

- Avian Science Center conducts statewide bird surveys
- Plan to target wetland/riverine habitats
- Need cooperation of all agencies
- Good timing to coordinate planning statewide wetland and bird monitoring programs

Summary

- A well-designed IBI can provide direct and integrated information about wetland and watershed conditions
  - Ecological processes

- Large numbers of species, low-tech surveys, and broad public support make birds an especially effective wetland assessment tool
- Now is a great time to develop a coordinated effort to monitor wetlands and wetland birds statewide.

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